

# **The Mars Surveyor Flight Operations Project Command Generation Process**

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**Abstract - The Mars Global Surveyor mission (MGS) will be the first in a series of Mars missions to return to Mars to recover the science lost when the ill fated Mars Observer spacecraft suffered a catastrophic anomaly in its propulsion system and was unable to attain orbital capture at the planet.**

**A major characteristic of these Mars missions is their fixed and severely constrained budgets. NASA has provided a set annual budget for flight operations and development.**

**All spacecraft must be operated and pre-flight preparations made for developing missions on a single budget. This strategy has forced the JPL flight operations and development organization to develop new and innovative methods for performing their functions. One logical outcome of this strategy has been to consolidate all Surveyor mission operations into one operations organization, the Mars Surveyor Flight Operations Project (MSFOP).**

**One of the major ground components of the MSFOP is its command generation process. It is by use of this set of computer hardware, software and procedures that commands are sent to the spacecraft, resulting in control of the spacecraft and its activities. The MSFOP command generation process is based on the Mars Global Surveyor process, which in turn was based on the Mars Observer process. However, the MSFOP process has been heavily automated so that the flight team can be staffed at levels commensurate with the restricted budget. In addition, new strategies for commanding have been developed which further streamline the commanding process.**

**This paper will describe in detail the methods employed by the MSFOP flight team to accelerate the command generation process. The use of scripts has made possible the automation of what once were very manual processes. Increases in flight team efficiency and the resulting flight team staffing level reductions will be discussed. Methods of risk mitigation employed during this development will be discussed. These and other techniques being developed by JPL, flight operations teams will make possible future planetary missions which can be flown within the tight budget constraints now being faced by NASA without compromising flexibility and responsiveness.**

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